

MERQUAT®

Polyquaternium 39 Series

Water Soluble Polymers for Personal Care



Product Bulletin PC-PolyQ-39

KEY FEATURES

MERQUAT PLUS 3330, MERQUAT PLUS 3331, MERQUAT 3330PR, MERQUAT 3331PR, MERQUAT 3333, MERQUAT 3940 and MERQUAT 3330DRY are patented amphoteric terpolymers that are compatible with anionic and amphoteric surfactants. MERQUAT PLUS 3331, MERQUAT 3330PR, MERQUAT 3331PR, MERQUAT 3333 and MERQUAT 3940 are non-animal tested.

These substantive amphoteric terpolymers are ideally suited for liquid cleansing products. In skin care products they provide silky skin feel and moisturization. In hair care formulations they provide excellent wet and dry combing properties.

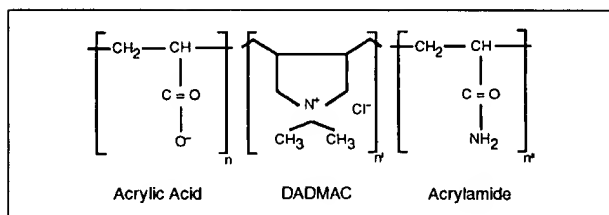
APPLICATIONS AND BENEFITS

Hair Care Products

Curl Activators, Bleaches, Dyes, Shampoos, Conditioners, Styling Products, and Permanent Waves

- Contributes luster and a soft, silky feel
- Provides excellent slip, lubricity and snag-free wet combability without excessive buildup
- Imparts excellent dry combability
- Adds sheen to dry hair
- Reduces static
- Helps hold curls without flaking
- Compatible with most anionic and amphoteric surfactants
- Provides superior conditioning properties for products with extreme pH ranges

CHEMICAL STRUCTURE



- High solids, low viscosity product (MERQUAT 3940) shows improved substantivity and hair conditioning
- Suggested starting concentration (as product):
 - 1.0% MERQUAT PLUS 3330, MERQUAT PLUS 3331, MERQUAT 3330PR, MERQUAT 3331PR and MERQUAT 3333
 - 0.25% MERQUAT 3940
 - 0.1% MERQUAT 3330DRY

Skin Care Products

Moisturizing Creams, Lotions, Bath Gels, Liquid Soaps, Soap Bars, Shaving Products, Antiperspirants, Deodorants and Suncare Products

- Provides excellent moisturization
- Imparts a smooth, velvety feel; reduces tightness after drying skin
- Contributes lubricity which can help make skin care products easier to apply
- Reduces irritation from liquid skin cleansing products
- Liquid cleansing products acquire richer, thicker foam with improved stability

INCI Designation: Polyquaternium-39

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 1.0% **MERQUAT PLUS 3330, MERQUAT PLUS 3331, MERQUAT 3330PR, MERQUAT 3331PR and MERQUAT 3333**
 0.25% **MERQUAT 3940**
 0.1% **MERQUAT 3330DRY**

Suggested concentrations serve only as a starting point when formulating. Optimum performance will vary according to formulation type and desired result.

FORMULATION TIPS

The polyquaternium-39 series of MERQUAT conditioning polymers is compatible with most major anionic and amphoteric surfactants, which affords greater formulating flexibility. For best clarity when formulating liquid cleansing products, it is recommended to add the MERQUAT polymer into an anionic surfactant or surfactant blend. Order of addition of formulation ingredients can also be adjusted to help achieve clarity.

Aqueous solutions of the terpolymers will tolerate up to 40% ethanol before becoming hazy. When formulating with Carbomers, hydrate and neutralize the Carbomer before adding the MERQUAT polymer.

DESCRIPTION

The polyquaternium-39 series of MERQUAT conditioning polymers are terpolymers of acrylic acid, diallyl dimethyl ammonium chloride and acrylamide. Specific product formulations are shown below.

| | MERQUAT PLUS 3330 | MERQUAT PLUS 3331 | MERQUAT 3330PR | MERQUAT 3331PR | MERQUAT 3333 | MERQUAT 3940 | MERQUAT 3330DRY |
|---|------------------------------|------------------------------|---------------------------|---------------------------|---------------------------|-------------------------|----------------------------|
| Acrylic Acid (mole %) | 35 | 22.5 | 35 | 22.5 | 66 | 31 | 35 |
| Diallyl dimethyl ammonium chloride (mole %) | 30 | 26.5 | 30 | 26.5 | 16 | 29 | 30 |
| Acrylamide (mole %) | 35 | 51 | 35 | 51 | 18 | 40 | 35 |
| Preservative system | Methyl and propyl paraben | Methyl and propyl paraben | Sodium benzoate | Sodium benzoate | Methyl and propyl paraben | Sodium benzoate | — |

TYPICAL PROPERTIES AND CHARACTERISTICS

| | MERQUAT PLUS 3330 | MERQUAT PLUS 3331 | MERQUAT 3330PR | MERQUAT 3331PR | MERQUAT 3333 | MERQUAT 3940 | MERQUAT 3330DRY |
|--|------------------------------------|------------------------------------|--------------------------------|---------------------------------|---------------------------------|--------------------------------|---------------------------------|
| Appearance | Clear, colorless viscous liquid | Clear, colorless viscous liquid | Clear, viscous liquid | Clear, viscous liquid | Clear, viscous liquid | Clear, viscous liquid | White to light yellow powder |
| Odor | Mild, aldehydic | Mild, aldehydic | Mild, aldehydic | Mild, aldehydic | Mild, aldehydic | Mild aldehydic | — |
| Color, APHA | 20 max | 15 max | 20 max | 15 max | 20 max | 200 max | — |
| Total Solids, % | 9.4–10.4 | 9.4–10.4 | 9.7–10.7 | 9.7–10.7 | 10.15–11.25 | 41.0–45.0 | ≥ 92 |
| pH | 5.5–7.0 | 5.5–7.0 | 3.5–4.5 | 3.3–4.5 | 6.0–7.2 | 3.5–4.5 | — |
| pH Stability Range | 3–12 | 3–12 | 3–12 | 3–12 | 3–12 | 3–12 | 3–12 |
| Viscosity, cps @ 25°C Brookfield: Spindle | 4,000–10,000 LVF #4 @ 30 rpm | 5,500–16,000 LVF #4 @ 30 rpm | 2,000–8,000 LVF #4 @ 30 rpm | 2,000–12,000 LVF #5 @ 30 rpm | 2,000–22,000 LVF #4 @ 12 rpm | 1,500–4,500 RVF #3 @ 10 rpm | — |
| Molecular Weight (GPC, MALLS) | 1.5 x 10 ⁶ | 1.6 x 10 ⁶ | 1.5 x 10 ⁵ | 1.6 x 10 ⁶ | 1.2 x 10 ⁶ | 1.5 x 10 ⁵ | 1.5 x 10 ⁵ |
| Recommended Use Levels % (as product) | 1.0–4.0 | 1.0–4.0 | 1.0–4.0 | 1.0–4.0 | 1.0–4.0 | 0.25–1.0 | 0.1–0.4 |

Toxicological Summary — For a summary of toxicological information, refer to the specific MERQUAT Water Soluble Conditioning Polymer Material Safety Data Sheet.

PACKAGING AND STORAGE

MERQUAT PLUS 3330, MERQUAT PLUS 3331, MERQUAT 3330PR, MERQUAT 3331PR and MERQUAT 3333 water soluble conditioning polymer are available in the following packages: polyethylene pails, polyethylene drums, liquid bins and in bulk.

MERQUAT 3940 water soluble conditioning polymer is available in polyethylene pails and polyethylene drums.

MERQUAT 3330DRY is available in fiber drum containers.

REMARKS

If you need sample formulations, assistance or other information, please call our Naperville, IL USA office at 1-630-305-1000 or visit our website at www.nalco.com/cosmetics.